Balance between thermopower, electric and magnetic interactions in CuCrO2, Bi8Rh7O22 and MnSc2Se4

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Propositions

1. The Thermally Stimulated Depolarization Current (TSDC) technique is remarkably sensitive to the presence of small amount of defects and trapped states.
2. Pyroelectric current and TSDC measurements are so sensitive to background noise that they work best only in the evening when nobody wanders around in the physics lab.
3. Reducing the grain size of a sample to increase the number of interfaces can reduce the thermal conductivity by increasing the phonon scattering. However, if the grains orient randomly, it reduces the current path and leads to a decrease in electrical conductivity, which is not favourable in thermoelectric materials.
4. The balance between thermopower, electrical conductivity and thermal conductivity is the art of thermoelectric materials.
5. The coupling between magnetic and dielectric properties in $MnSc_2Se_4$ reveals a spin-spiral liquid regime resulting from the strong magnetic frustration.
6. Successful chemical synthesis in the lab is a combination of many factors including knowledge, curiosity, hard work, flexibility, patience and fortune.
7. To solve a problem, in some cases it is wise to avoid distracting thoughts in order to focus on the core of the problem and break through it.
8. The mind is miraculous. It adapts to all conditions and one can easily be misled.